


Techniques Used to Generate a Set of Aerosol Optical Extinctions for Use in Modeling Radiative, Chemical, and Dynamical Effects of the Mt. Pinatubo Eruption.

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The June 1991 eruption of Mt. Pinatubo has presented a rare opportunity to compare the chemical, radiative and dynamical responses predicted by atmospheric models with in situ and satellite measurements. Based on the history of research following the eruption of El Chichón, interest in modeling and understanding the effects of the Mt. Pinatubo eruption will continue for at least another decade. The accomplishment and comparison of such modeling efforts requires the availability of spatially complete and temporally continuous sets of aerosol optical properties and surface areas. These requirements are in sharp contrast to any single set of measurements. To estimate photochemical effects, aerosol optical properties have to be extrapolated into UV wavelengths outside the spectral range of available satellite measurements. Either explicitly or implicitly this requires estimation of the aerosol size distribution and composition.

This paper focuses on the observations, physical assumptions, and numerical techniques we used in creating an aerosol optical data set useful for modeling the chemical and climate response of the Mt. Pinatubo eruption. The analyses constitutes merging visible data from SAGE-II with IR data from UARS instruments along with in situ measurements of scattering profiles (lidar) and vertical and size-distributions (balloon and airborne). Numerical techniques for interpolating and merging these data were drawn from optimal interpolation, retrieval theory, and geostatistics.

We present our resulting data showing the time-evolution of zonally averaged aerosol extinctions for multiple wavelengths .

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